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EXAMINER	
SPAR, ILANA L	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,755	BEN-DAVID ET AL.	
	Examiner	Art Unit	
	ILANA SPAR	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32,36 and 38-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32,36 and 38-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/21/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 10, 11, 14-19, and 26-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Roth et al. (WO 03/088203).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

With reference to claim 1, Roth et al. teaches a color display device for displaying a more-than-three color image, the device comprising a driver control module (218) to controllably activate one or more drivers of an array of sub-pixel elements of at least four different colors based on image data representing pixels of said color image in terms of at least three data components (see page 12, lines 15-32).

With reference to claim 2, Roth et al. teaches all that is required with reference to claim 1, and further teaches that said driver control module is able to generate one or more driver signals for activating said drivers based on one or more display attributes related to said display device and one or more image attributes related to said color image (see page 12, lines 29-32).

With reference to claim 3, Roth et al. teaches all that is required with reference to claim 2, and further teaches that the driver control module comprises:

a conversion module to convert the image data representing pixels of said color image in terms of at least three data components into converted sub-pixel data representing said color image in terms of four or more colors (see page 12, lines 15-32); and

a controller to control said conversion module to convert said image data based on said one or more display-attributes and said one or more image-attributes (see page 12, lines 29-32).

With reference to claim 10, Roth et al. teaches all that is required with reference to claim 3, and further teaches that the driver control module comprises a sub-pixel processor to process said converted sub-pixel data, wherein said controller is able to

control said processor to generate a sub-pixel signal based on at least one of said image attributes and said display attributes (see page 12, lines 15-32).

With reference to claim 11, Roth et al. teaches all that is required with reference to claim 10, and further teaches an interface module to generate said driver signals based on said sub-pixel data signal (see page 12, lines 15-32).

With reference to claim 13, Roth et al. teaches all that is required with reference to claim 2, and further teaches that the one or more display-attributes comprise at least one attribute selected from the group consisting of a configuration of said sub-pixel elements within said array, a configuration of one or more defective sub-pixel elements within said array, a brightness non-homogeneity of said display device, and a color non-homogeneity of said display device (see page 17, lines 24-26).

With reference to claim 14, Roth et al. teaches all that is required with reference to claim 2, and further teaches that the one or more image-attributes comprise one or more attributes selected from the group consisting of a perceived bit-depth of pixels of at least part of said image, a viewed smoothness of at least part of said image, a brightness uniformity of at least part of said image, a color uniformity of at least part of said image, and a rendering scheme to be applied to at least part of said image (see page 17, lines 24-26 and page 29, lines 8-11).

With reference to claim 15, Roth et al. teaches all that is required with reference to claim 1, and further teaches a display panel containing said driver control module and said array of sub-pixel elements (see page 12, lines 15-25).

With reference to claim 16, Roth et al. teaches all that is required with reference to claim 1, and further teaches that the array of sub-pixel elements comprises an array of liquid crystal elements (see page 12, lines 15-17).

With reference to claim 17, Roth et al. teaches a method of displaying a more-than-three color image comprising controllably activating one or more drivers of an array of sub-pixel elements of at least four different colors, based on image data representing pixels of said color image in terms of at least three data components (see page 12, lines 15-32).

With reference to claim 18, Roth et al. teaches all that is required with reference to claim 17, and further teaches generating one or more driver signals for activating said drivers based on one or more display attributes related to said display device and one or more image attributes related to said color image (see page 12, lines 29-32).

With reference to claim 19, Roth et al. teaches all that is required with reference to claim 18, and further teaches converting the image data representing pixels of said color image in terms of at least three data components into converted sub-pixel data representing said color image in terms of said at least four colors (see page 12, lines 15-32).

With reference to claim 26, Roth et al. teaches all that is required with reference to claim 19, and further teaches processing said converted sub-pixel data and generating a sub-pixel signal based on at least one of said image attributes and said display attributes (see page 12, lines 15-32).

With reference to claim 27, Roth et al. teaches all that is required with reference to claim 26, and further teaches said driver signals based on said sub-pixel data signal (see page 12, lines 15-32).

With reference to claim 28, Roth et al. teach all that is required with reference to claim 18, and further teaches that the one or more display-attributes comprise at least one attribute selected from the group consisting of a configuration of said sub-pixel elements within said array, a configuration of one or more defective sub-pixel elements within said array, a brightness non-homogeneity of said display device, and a color non-homogeneity of said display device (see page 17, lines 24-26).

With reference to claim 29, Roth teaches all that is required with reference to claim 18, and further teaches that the one or more image-attributes comprise one or more attributes selected from the group consisting of a perceived bit-depth of pixels of at least part of said image, a viewed smoothness of at least part of said image, a brightness uniformity of at least part of said image, a color uniformity of at least part of said image, and a rendering scheme to be applied to at least part of said image (see page 17, lines 24-26 and page 29, lines 8-11).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 4 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. in view of Kuriwaki et al. (EP 0 831 451).

With reference to claim 4, Roth et al. teaches all that is required with reference to claim 3, but fails to teach two converters.

Kuriwaki et al. teaches that the conversion module comprises:

a first converter (2) to convert the image data representing pixels of said color image in terms of at least three data components into intermediate sub-pixel data of said four or more colors (see Figure 3 and page 4, lines 8-14); and

a second converter (3) to convert said intermediate sub-pixel data into said converted sub-pixel data, based on at least one of said display attributes and said image attributes (see Figure 3 and page 4, lines 15-22).

It would have been obvious to one of ordinary skill in the art at the time of invention to use two converting circuits to convert the RGB data to four-color data such that each converter is designed to carry out a specific task; in this case, one converter is used to modify the data format, while the other is then able to turn the new data into

light-controlling signals which the display can read. This simplifies the construction of the converters and can increase processing speed.

With reference to claim 20, Roth et al. teaches all that is required with reference to claim 19, but fails to teach two converters.

Kuriwaki et al. teaches that converting the image data representing pixels of said color image in terms of at least three data components comprises:

converting the image data representing pixels of said color image in terms of at least three data components into intermediate sub-pixel data of said at least four colors (see Figure 3 and page 4, lines 8-14); and

converting said intermediate sub-pixel data into said converted sub-pixel data, based on at least one of said display attributes and image attributes (see Figure 3 and page 4, lines 15-22).

It would have been obvious to one of ordinary skill in the art at the time of invention to use two converting circuits to convert the RGB data to four-color data such that each converter is designed to carry out a specific task; in this case, one converter is used to modify the data format, while the other is then able to turn the new data into light-controlling signals which the display can read. This simplifies the construction of the converters and can increase processing speed.

7. Claims 5-8, 12, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. in view of Kumada et al. (US Patent No. 5,563,725).

With reference to claim 5, Roth et al. teaches all that is required with reference to claim 4, but fails to teach a conversion matrix.

Kumada et al. teaches that the second converter is able to convert said intermediate sub-pixel data using at least one conversion matrix, which is based on at least one of said display attributes and said image attributes (see column 8, lines 9-12).

It would have been obvious to one of ordinary skill in the art at the time of invention to use a conversion matrix to convert the data from 3 colors to 4 colors, as is commonly known in the art, and it would have further been obvious to base the conversion on the properties which the converted data would need to possess in order to be correctly displayed.

With reference to claim 6, Roth et al. teaches all that is required with reference to claim 3, but fails to teach two converters.

Kumada et al. teaches that the conversion module comprises:

a first converter (52) to convert the image data representing pixels of said color image in terms of at least three data components into first intermediate sub-pixel data of said four or more colors (see Figure 2 and column 1, lines 46-49);

a second converter (54) to convert the image data representing pixels of said color image in terms of at least three data components into second intermediate sub-pixel data of three or more colors (see Figure 2 and column 1, lines 49-52); and

a combiner (56) to combine said first and second intermediate sub-pixel data into said converted sub-pixel data (see Figure 2 and column 1, lines 52-56),

wherein said controller is able to control at least one of said first and second converters and said combiner based on at least one of said display attributes and image attributes (see column 1, lines 42-56).

It would have been obvious to one of ordinary skill in the art at the time of invention to use two converting circuits to convert the RGB data to four-color data such that each converter is designed to carry out a specific task; in this case, one converter is used to modify the data format, while the other is then able to match the format of the data with the properties which the data would need to possess in order to be properly displayed. This simplifies the construction of the converters and can increase processing speed.

With reference to claim 7, Roth et al. and Kumada et al. teach all that is required with reference to claim 6, and Kumada et al. further teaches that the second converter is able to convert the image data representing pixels of said color image in terms of at least three data components using at least one conversion matrix, which is based on at least one of said display attributes and said image attributes (see column 8, lines 9-12).

With reference to claim 8, Roth et al. and Kumada teach all that is required with reference to claim 5, and Kumada et al. further teaches that the controller is able to determine one or more values of said conversion matrix based on a combination of said one or more display-attributes and said one or more image-attributes (see column 8, lines 9-12 and column 2, lines 52-55).

It would have been obvious to one of ordinary skill in the art at the time of invention to base the conversion on the properties which the converted data would need to possess in order to be correctly displayed, with it necessary to accommodate both the data to be displayed and the display on which the data will be displayed.

With reference to claim 12, Roth et al. teaches all that is required with reference to claim 2, but fails to teach a memory to store display attributes.

Kumada et al. teaches a memory to store display-related data representing said one or more display attributes (see column 6, lines 35-39).

It would have been obvious to one of ordinary skill in the art at the time of invention to store display attributes in a memory such that they can easily and repeatedly be accessed as necessary to convert the incoming data.

With reference to claim 22, Roth et al. teaches all that is required with reference to claim 19, but fails to teach two converters.

Kumada et al. teaches that converting the image data comprises:

converting the image data representing pixels of said color image in terms of at least three data components into first intermediate sub-pixel data of said at least four primary colors (see Figure 2 and column 1, lines 46-49);

converting the image data representing pixels of said color image in terms of at least three data components into second intermediate sub-pixel data of at least three primary colors (see Figure 2 and column 1, lines 49-52);

combining said first and second intermediate sub-pixel data into said converted sub-pixel data (see Figure 2 and column 1, lines 52-56); and

controlling at least one of converting said image data into said first intermediate sub-pixel data, converting said image data into said second intermediate sub-pixel data, and said combining, based on at least one of said display attributes and said image attributes (see column 1, lines 42-56).

It would have been obvious to one of ordinary skill in the art at the time of invention to carry out two conversions to convert the RGB data to four-color data such that each converter is designed to carry out a specific task; in this case, one converter is used to modify the data format, while the other is then able to match the format of the data with the properties which the data would need to possess in order to be properly displayed. This simplifies the construction of the converters and can increase processing speed.

With reference to claim 23, Roth et al. and Kumada et al. teach all that is required with reference to claim 22, and Kumada et al. further teaches that converting said image data into said second intermediate sub-pixel data comprises converting said image data using at least one conversion matrix, which is based on at least one of said display attributes and said image attributes (see column 8, lines 9-12).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. and Kumada et al. as applied to claim 8 above, and further in view of Inoue (US Patent No. 5,896,178). Inoue teaches that the controller is able to determine one or more values of said conversion matrix based on one or more timing signals related to said image data (see column 8, lines 21-24).

It would have been obvious to one of ordinary skill in the art at the time of invention to base the conversion factors on the timing of the display signal such that the modified data is still displayed for the intended amount of time. The need for this becomes even further obvious when the display signal is a video signal.

9. Claims 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. and Kuriwaki et al. as applied to claim 20 above, and further in view of Kumada et al.

With reference to claim 21, Roth et al. and Kuriwaki et al. fail to teach a conversion matrix.

Kumada et al. teaches that converting the intermediate sub-pixel data comprises converting said intermediate sub-pixel data using at least one conversion matrix, which is based on at least one of said display attributes and said image attributes (see column 8, lines 9-12).

It would have been obvious to one of ordinary skill in the art at the time of invention to use a conversion matrix to convert the data from 3 colors to 4 colors, as is commonly known in the art, and it would have further been obvious to base the conversion on the properties which the converted data would need to possess in order to be correctly displayed.

With reference to claim 24, Roth et al., Kuriwaki et al., and Kumada et al. teach all that is required with reference to claim 21, and Kumada et al. further teaches determining one or more values of said conversion matrix based on a combination of said one or more display-attributes and said one or more image-attributes (see column 8, lines 9-12 and column 2, lines 52-55).

10. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. in view of Kuriwaki et al. in view of Kumada et al. as applied to claim 21 above, and further in view of Inoue. Inoue further teaches determining one or more values of said

conversion matrix based on one or more timing signals related to said image data (see column 8, lines 21-24).

It would have been obvious to one of ordinary skill in the art at the time of invention to base the conversion factors on the timing of the display signal such that the modified data is still displayed for the intended amount of time. The need for this becomes even further obvious when the display signal is a video signal.

11. Claims 30-32, 36, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al.

With reference to claim 30, Roth et al. teaches a color display system for displaying a more-than-three color image, the system comprising:

a driver control module (218) to controllably activate one or more drivers of an array of sub-pixel elements of at least four different colors, based on said image data signals (see page 12, lines 15-32).

Roth et al. does not explicitly teach an input interface to generate image data signals representing pixels of said color image in terms of at least three data components; however, it would have been obvious that some type of data generator would be necessary to create a display signal, and an RGB signal, which represents color images with three components is well known in the art.

With reference to claim 31, Roth et al. teaches all that is required with reference to claim 30, and further teaches that the driver control module is able to generate one or more driver signals for activating said drivers based on one or more display attributes

related to said display device and one or more image attributes related to said color image (see page 12, lines 29-32).

With reference to claim 32, Roth et al. teaches all that is required with reference to claim 31, and further teaches that the driver control module comprises:

a conversion module to convert said image data signals into converted sub-pixel data signals representing said color image in terms of four or more colors (see page 12, lines 15-32); and

a controller to control said conversion module to convert said image data signals based on said one or more display-attributes and said one or more image-attributes (see page 12, lines 29-32).

With reference to claim 36, Roth et al. teaches all that is required with reference to claim 32, and further teaches that the driver control module comprises a sub-pixel processor to process said converted sub-pixel data signals, wherein said controller is able to control said processor to generate a sub-pixel signal based on at least one of said image attributes and said display attributes (see page 12, lines 15-32).

With reference to claim 38, Roth et al. teaches all that is required with reference to claim 30, and further teaches that the one or more display-attributes comprise at least one attribute selected from the group consisting of a configuration of said sub-pixel elements within said array, a configuration of one or more defective sub-pixel elements within said array, a brightness non-homogeneity of said display device, and a color non-homogeneity of said display device (see page 17, lines 24-26).

With reference to claim 39, Roth et al. teaches all that is required with reference to claim 30, and further teaches that the one or more image-attributes comprise one or more attributes selected from the group consisting of a perceived bit-depth of pixels of at least part of said image, a viewed smoothness of at least part of said image, a brightness uniformity of at least part of said image, a color uniformity of at least part of said image, and a rendering scheme to be applied to at least part of said image (see page 17, lines 24-26 and page 29, lines 8-11).

With reference to claim 40, Roth et al. teaches all that is required with reference to claim 30, and further teaches a display panel containing the driver control module and the array of sub-pixel elements (see page 12, lines 15-25).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cok et al. (US Patent No. 6,570,584) teaches a display which receives a three-component signal and converts it to be displayed on a four-color pixel. Ben-Chorin et al. (WO 02/099557) teaches a display which converts a three-component signal to a four-color display signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ILANA SPAR whose telephone number is (571)270-7537. The examiner can normally be reached on Monday-Thursday 8:00-4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571)272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Bipin Shalwala/
Supervisory Patent Examiner, Art Unit 2629

ILS